TRUST AND TECHNOLOGY DIFFUSION WITHIN THE MEAT SUPPLY CHAIN: A CONCEPTUAL FRAMEWORK

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ABSTRACT

Literature lacks theoretical framework to direct empirical research on establishing critical success factors affecting the competitiveness of meat supply chain management. This paper fills the gap in the literature. The suggested framework stems from Freeman's definition of stakeholder theory. Based on his definition, this research concentrates only on the area of interception between three theories employed: stakeholder theory, trust theory, and diffusion of innovation (DOI) theory. That is, from the viewpoint of trust theory, the research considers only the stakeholders' perceptions of technology diffusion within the meat supply chain, and from the DOI theory viewpoint, the research considers only the stakeholders' perception of trust within the meat supply chain.

Keywords: Critical Success Factors, Diffusion of Innovation Theory, Meat Supply Chain Management, Stakeholder Theory, Trust Theory.

INTRODUCTION

Australia's red meat industries are becoming more consumer-focused and cost competitive through research, development and adoption of supply chain management (MLA, 2004). Supply chain management (SCM) includes managing supply and demand, sourcing raw materials and parts, manufacturing and assembly, distribution across all channels, and delivery to the customer (Supply Chain Council, 2004). In 1985, the Australian Meat and Livestock Corporation (AMLC) recognized of the importance of customer requirements and satisfaction in both local and global meat markets. AMLC initiated a program to change the meat industry culture from being 'production-driven' to being 'customer-driven' (Bindon and Jones, 2001). Introduced in 1997, the Meat Standards Australia Scheme attempted to enhance the quality of the meat production. Since then, AMLC and Meat and Livestock Australia (MLA) instigated several initiatives and programs to enhance collaborations and strategic alliances within the meat supply chain which include SCM Learning, E-Business, SCM Action, and SCM Funding.

The two sections that follow briefly discuss the lamb and beef production industrial sectors in Australia. Next, the critical success factors affecting the meat supply chain are identified followed by an overview of research motivation as well as the proposed contributions from the research. This is followed by the development of a theoretical framework.

THE LAMB INDUSTRY

Of about 20,000 lamb producers in Australia, nearly 75% are non-specialist producers whose primary enterprises include wool, beef and grain production (MLA, 2001b). A

majority of these lamb producers are wool producers shifting into lamb production when wool prices are down and/or when lamb prices seem promising. Although lamb consumption has declined over the last 20 years, lamb export sales has consistently increased, quarter by quarter since 1990 (MLA, 2001a). During the 1990s, lamb exports had expanded by 400% and this trend is expected to continue. A decrease in sheep population around the world and the on-going disease scares also resulted in an increase in Australian mutton exports. A five-year strategic plan (2001 – 2006) was developed by MLA and the Sheepmeat Council of Australia to support the development of SCM practices in order to maintain the vision of "Australia as the leading global food market provider of lamb and sheepmeat products" (MLA, 2001b).

THE BEEF INDUSTRY

Low cattle numbers worldwide and expanding markets in Pacific Asian region provide a potentially advantageous position for the Australian beef export industry. Australia with only 2.5% of world cattle numbers in 2001 (Bindon and Jones, 2001), retain the position of number two beef trader after USA – about 21% of global beef export in 2001 (Seng, 2003). A major influence on the Australian beef markets over the past decade was the increment in live cattle exports to Indonesia, Malaysia and Philippines. In Queensland, the beef industries comprise about 47% of total Australia cattle numbers and 28% of specialist beef properties (ABARE, 1998). Around 80% of Queensland beef is exported in 2001 (DPI, 2001).

The Australian Meat Research Corporation (AMRC) kicked off a four-year program, referred to as BeefNet (Beef Marketing Support Network), in June 1997. BeefNet aims to support the establishment of producer groups throughout Australia, and foster a supply chain culture across the meat industry (MLA, 2002). However, these projects have not overcome some noteworthy limitations in acquiring a greater market share, such as a lack of forward price or risk management systems; and producers' reluctance to commit supply of products due to seasonal uncertainty with grass-field livestock (MLA, 2001b).

THEORETICAL FRAMEWORK

Freeman (1984) explains the stakeholder theory (ST) as the relationship of the firm to its external environment, and its behavior within this external environment. However, a problem exists with Freeman's definition of ST. The organizational behavior within the internal environment of the firm has a direct influence on its behavior in the external environment. Accordingly, this research considers the organizational behavior within its internal environment as well as its external environment.

It is likely that many stakeholders will collaborate or form strategic alliances to better their competitive position (Hoyt and Huq, 2000; Monczka, Peterson, Handfield and Ragatz, 1998; Peters and Hogensen, 1999). In order to form effective collaboration or strategic alliances, good information sharing between stakeholders is required (Dyer and Singh, 1998; Handfield and Nichols, 1999; Henriott, 1999; Mariotti, 1999). This is when issues pertaining to trust arise (Lengnick-Hall, 1998). Various literatures found that many organizations are still reluctant in releasing information to be shared with others.

Business-to-Business (B2B) refers to business transactions between organizations (Chopra and Meindl, 2004). To widen this scope, it also relates to an exchange of information between firms. However, to build effective, real-time information sharing of sales and production without any delays, the information and communication technology (ICT) medium(s) between the collaborative organizations, such as the intranet and electronic data interchange (EDI), are required to be compatible and consistent in their infrastructures (Henriott, 1999; Mariotti, 1999). To put it simply, it requires the same level of technology diffusion.

Diffusion theory is synonymous with the term diffusion of innovation (DOI) theory which is developed by Rogers (1995). The common dimension of innovation diffusion is the source of the newness, such as the organization, the market, the technology, the product and the process (Kamm, 1987). Previous innovation diffusion research has been concerned with various issues including the definition of innovation diffusion (Rhodes and Wield, 1994; Afuah, 1998), the generation of innovation diffusion (Forsgren and Johanson, 1992; Nohria and Ghoshal, 1997), innovation diffusion in organizations (Daft, 1986; Damanpour, 1991), innovation diffusion in marketing (Simmonds, 1986), technological innovation diffusion (Howell and Higgins, 1990; Lawless and Anderson, 1996), process innovation diffusion (Davenport, 1993), value innovation diffusion (El Sawy, Malhotra, Gosian and Young, 1999) and innovation diffusion in information systems (Allen, 2000; Cooper and Zmud, 1990; Swanson, 1994). Among the various diffusions, this research focuses specifically on the diffusion of ICT, dealing as it does with B2B.

Rogers (1995) asserts that innovation diffusion may vary with differing cultures of urban and rural environments. Meat supply chain entities include farmers, producers, abattoirs, distributors and such, are located in rural areas, while a large number of retailers and consumers are mainly located in urban areas (Figure 1). Technology diffusion in rural areas is much slower than that in urban areas (Newell, Swan and Galliers, 2000). This research argues that a gap exists between the degrees of ICT diffusion within the various meat supply chain entities. This gap has a direct influence on the flow of information through the meat supply chain, which ultimately affects information sharing. Prior research indicates that ICT diffusion, trust, as well as rural and urban cultures may bring about a change in organizational behavior, as shown in Figure 2. This change in stakeholders' behavior, can take place both internally and externally.

As shown in Figure 2, this research concentrates on stakeholder perceptions on collaboration issues which are directly influenced by trust and ICT diffusion. However, trust theory and DOI theory cover a wide range of aspects and issues. This research deals only with the interception of the three theories (stakeholder theory, trust theory, and DOI theory) as shown in Figure 3. From the viewpoint of trust theory, this research takes into consideration the stakeholders' perceptions of ICT diffusion. Similarly, from the viewpoint of ICT diffusion, the research considers the stakeholders' perceptions of trust.

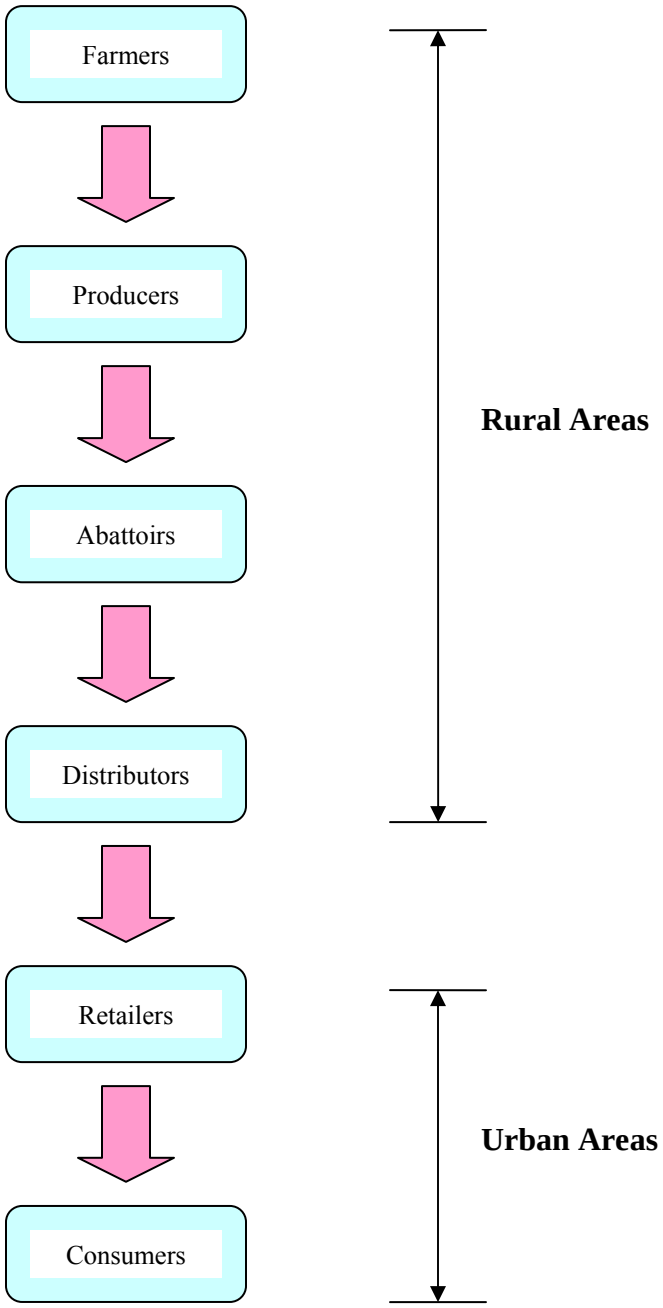

Figure 1. Rural and urban areas differentiation.

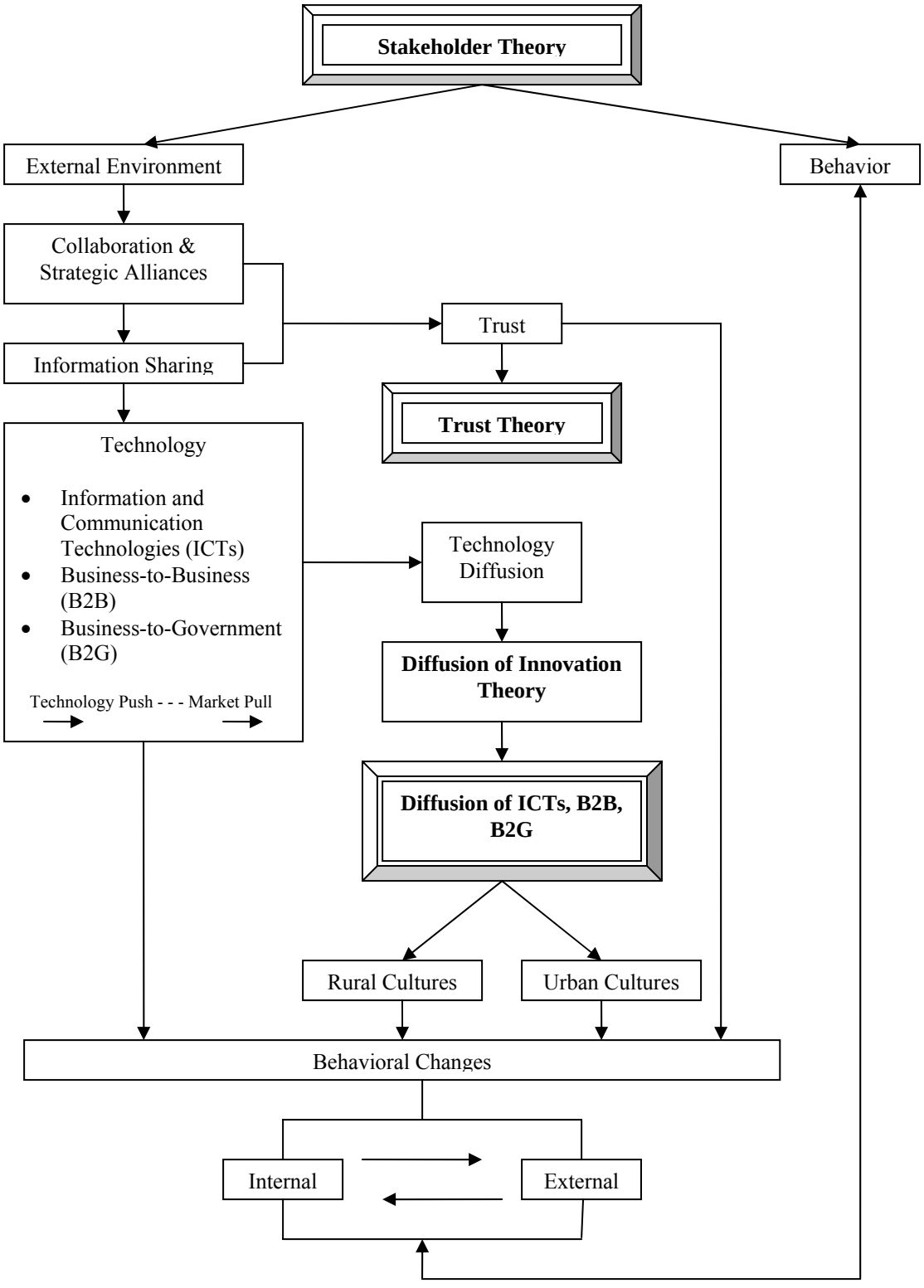

Figure 2. Theoretical Framework.

Table 1. Categories Affecting Meat Supply Chain

Categories	ABL, 2001	Spekman, Kamauff & Myhr, 1998	Hepner, Wilcock & Aung, 2004	Palmer, 1996	Zylbersztajn & Filho, 2003	Verbeke, 2000	Yu, Yan & Cheng, 2001	Bindon & Jones, 2001	McNeil & Wilson, 1997	MLA, 2002 - 2004	Sadler & Hines, 2002
Strategies					√						√
Logistics	√										√
Purchasing and procurement											
Inventory management											
Manufacturing and quality systems	√		√					√			√
Partnership and collaboration		√		√	√		√		√	√	√
Customer relations management						√			√		
Information flow and technology	√			√			√				
Supply chain agility											
Organizational factors	√										

Table 2. Specific Factors Affecting Meat SCM

Specific Factors	Calder & Marr, 1998	Viaene & Verbeke, 1998	ABL, 2001	MLA, 2004	West , Lauue, Touil and Scott 2001	Peterson, Eenoo, McGuiirk and Preckel, 2001
Traceability	√	√				
Safety			√			
Animal welfare			√			
Feeding methods				√		
Appearance					√	
Age and sex					√	
Society perceptions						√

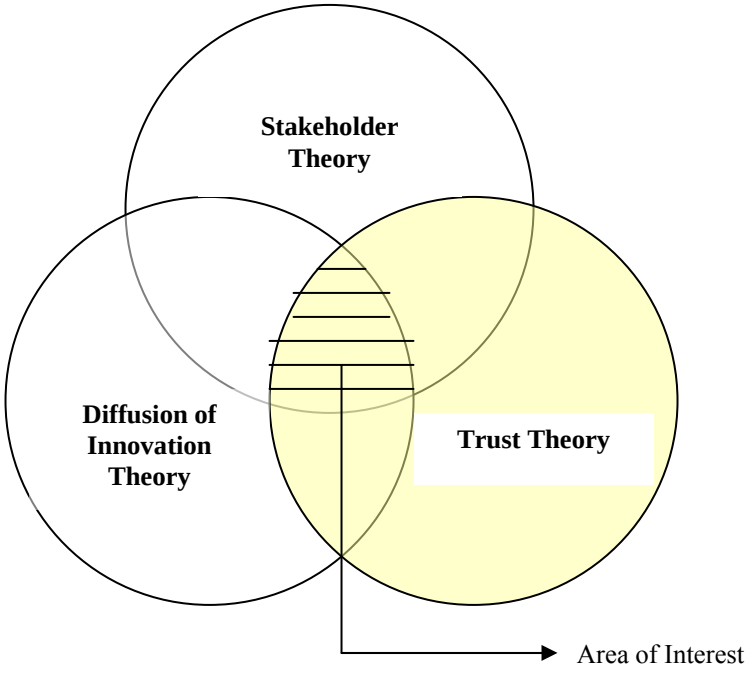

Figure 3. Theoretical Boundaries.

CRITICAL FACTORS

The concept of critical success factors (CSFs) was first defined by Rochart (1997) as the limited number of identified operational goals shaped by the industry, the firm, the manager, and the broader environment that are believed if they are satisfactory, will ensure successful competitive advantage performance for the organization (Laudon and Laudon, 2002). The CSF approach has become an accepted top-down methodology for corporate strategic planning (Chen, 1999). It highlights the key requirements of top management (Byers and Blume, 1994). One can conclude from the literatures that identifying CSF forms the first step for developing a roadmap for improving performance and hence competitive advantage (Laudon and Laudon, 2002).

There are numerous researches investigating the CSFs of general and manufacturing supply chain (Al-Hakim, 2003; Chopra and Meindl, 2004; Handfield and Nichols, 1999; Lambert and Cooper, 2000; Lummus and Vokurka, 1999; The Supply Chain Council, 2004; Power, 2004). Factors affecting supply chain can be grouped into ten categories: strategies; logistics; purchasing and procurement; inventory management; manufacturing and quality systems; partnership and collaboration; customer relations management; information flow and technology; and organizational factors.

However, there are limited researches on critical factors affecting the meat supply chain within these categories. Table 1 indicates the summary of the literature review identifying the factors influencing meat supply chain based on the above mentioned categories. Having said, there are critical factors which are unique to the meat industry that lies outside the realm of the categories of factors mentioned in Table 1. Table 2 identifies the specific factors affecting the meat supply chain.

Link with Theoretical Framework

Evidence to show that there is a lack of research concentrating within the realm of the suggested three theories in meat supply chain. In addition, Table 1 and Table 2 show that there is a lack of studies that consider comprehensively both the general factors and specific factors affecting the meat supply chain. As such, an empirical study for identifying critical factors affecting meat supply chain within the suggested theoretical framework will make two new contributions to the literature:

1. It will identify the gap between the degrees of ICT diffusion within the meat supply chain entities. This gap directly influences the flow of information within the meat supply chain and affects information sharing between entities. The entities of the meat supply chain can be separated into two specific areas of occurrence: rural and urban. As Rogers (1995) suggests, the technology diffusion within these two areas is significantly different. And;
2. It deals with the interception of the three theories (stakeholder theory, trust theory, and DOI theory); that is, from the trust theory viewpoint, the stakeholders' perceptions of ICT diffusion will be taken into account; and from the ICT diffusion viewpoint, the stakeholders' perceptions of trust will be taken into account.

Given the fact that Australia is one of the leading countries in exporting meat globally, having an empirical study within the suggested theoretical framework study will enhance the competitiveness of the Australian meat supply chain.

CONCLUSION

This research deals with a specific type of supply chain in Australia, that is, the red meat supply chain which involves mainly lamb and beef products. It provides a brief summary of the development in both meat sectors in Australia and emphasises that Australia is one of the leading countries in exporting meat globally. Accordingly, developing a theoretical framework to direct field research and empirical studies will enhance the competitiveness of the Australian Meat supply chains.

This research raises the importance of information sharing between organizations and points to two main issues hindering the flow of information across the meat supply chain. The first is the trust as many organizations are still reluctant in releasing information to be shared with other entities of the supply chain. The second issue is the gap of technology diffusion in rural and urban areas. Meat supply chain entities include farmers, producers, abattoirs, distributors are located in rural areas, while a large number of retailers and consumers are mainly located in urban areas.

To deal with information sharing affectively, the research concentrates on stakeholder perceptions on collaboration issues which are directly influenced by trust and technology diffusion. The research develops a theoretical framework that considers trust theory, diffusion of innovation (DOI or technology diffusion) theory in connection with stakeholder theory. However, trust theory and DOI theory cover a wide range of aspects and issues. This research deals only with the interception of the three theories;

stakeholder theory, trust theory, and DOI theory. From the viewpoint of trust theory, this research takes into consideration the stakeholders' perceptions of ICT diffusion. Similarly, from the viewpoint of technology diffusion, the research considers the

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